

In the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

- 1 1. (Original) A video signal processing apparatus to process an input video signal for displaying an image based on the video signal comprising:
 - 2 a detector to detect a gradation level of the input video signal; and
 - 3 a processor to depress a color saturation level of the input video signal in a predetermined color saturation level range only when the
 - 4 detected gradation level is located in a predetermined gradation level
 - 5 range.
 - 6
 - 7
- 1 2. (Original) The apparatus according to claim 1, wherein the detector includes a generator to generate a control signal when the detected gradation level is located in the predetermined gradation level range, a level of the control signal varying according to the detected gradation level, the processor depressing the color saturation level of the input video signal in response to the control signal.
- 1 3 (Original) The apparatus according to claim 2 , wherein the smaller the detected gradation level in the predetermined gradation level range from the level zero to a first predetermined gradation level, the larger the level of the control signal, the larger the detected gradation level in the predetermined gradation level range from the first predetermined gradation level to a second predetermined gradation level that is larger than the first gradation level, the larger the level of the control signal, and the smaller the detected gradation level in the predetermined gradation level range from the second predetermined gradation level to a third predetermined gradation level that is larger than the second gradation level, the larger the level of the control signal.
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1 4. (Original) The apparatus according to claim 2, wherein the processor
2 includes:

3 a generator to generate a color saturation depression amount
4 according to the level of the control signal; and
5 a subtractor to subtract the color saturation depression amount
6 from the input video to depress the color saturation level of the input
7 video signal according to the level of the control signal.

1 5. (Original) The apparatus according to claim 4, wherein the larger the level
2 of the control signal from the level zero to a predetermined control signal
3 level, the larger the color saturation depression amount, while larger the
4 level of the control signal from the predetermined control signal level to a
5 predetermined maximum control signal level, the smaller the color
6 saturation depression amount.

1 6. (Currently Amended) An apparatus for converting a first input video signal
2 having a first gradation level into a second video signal having a second
3 gradation level that is lower than first gradation level, for displaying an
4 image based on the input video signal comprising:

5 a generator an error detector to generate error data in response to
6 a data portion of the first input video signal, the data portion
7 corresponding to a difference between the first and the second gradation
8 levels, the error data being obtained by multiplying the data portion by
9 predetermined error diffusion coefficients according to pixel dots that
10 surround a pixel dot composed of R(red)-, G(green)- and B(blue)-signal
11 components of the first input video signal, at least one of the error
12 diffusion coefficients for one of the R-, G- and B-signal components being
13 different from the other error diffusion coefficients for the other signal
14 components; and

15 an adder to add the generated error data to the first input video
16 signal, thus converting the first input video signal into the second video
17 signal.

- 1 7. (Original) The apparatus according to claim 6, wherein the generator
- 2 generates a predetermined number of error data for multiplying a data
- 3 portion of an input video signal that has been input by a predetermined
- 4 period ago by the error diffusion coefficients according to the
- 5 predetermined number of the surrounding pixel dots, the adder adding
- 6 the predetermined number of error data to the present input video signal.

- 1 8. (Currently Amended) An apparatus for converting a first input video signal
- 2 having a first number of bits into a second video signal having a second
- 3 number of bits that is smaller than first number of bits, for displaying an
- 4 image based on the input video signal comprising:
 - 5 ~~a generator an error detector~~ to generate error data in response at
 - 6 least to a data portion of lower significant bits of the first number of bits of
 - 7 the first input video signal, the lower significant bits corresponding to a
 - 8 difference between the first and the second number of bits, the error data
 - 9 being obtained by multiplying the data portion by predetermined error
 - 10 diffusion coefficients according to pixel dots that surround a pixel dot
 - 11 composed of R(red)-, G(green)- and B(blue)-signal components of the
 - 12 first input video signal, at least one of the number of bits of the error
 - 13 diffusion coefficients for one of the R-, G- and B-signal components being
 - 14 different from the other number of bits of the error diffusion coefficients
 - 15 for the other signal components; and

 - 16 an adder to add the generated error data to the first input video
 - 17 signal, thus converting the first input video signal into the second video
 - 18 signal.

- 1 9. (Original) The apparatus according to claim 8, wherein the error diffusion
- 2 coefficients are different from each other when the number of bits of the
- 3 error diffusion coefficients is the same each other.

- 1 10. (Original) A method of displaying an image based on an input video
- 2 signal, the method comprising the steps of:
 - 3 applying reverse-gamma correction to an input first video signal;
 - 4 converting the reverse-gamma correction-applied input first video
 - 5 signal having a first gradation level into a second video signal having a
 - 6 second gradation level that is lower than first gradation level by
 - 7 multi-gradation processing; and
 - 8 switching the signal conversion between a first state in which the
 - 9 input first video signal requires multi-gradation processing and a second
 - 10 state in which the input first video signal does not require multi-gradation
 - 11 processing.
- 1 11. (Original) A method of displaying an image based on an input video
- 2 signal, the method comprising the steps of:
 - 3 applying reverse-gamma correction to an input first video signal;
 - 4 converting the reverse-gamma correction-applied input first video
 - 5 signal having a first number of bits into a second video signal having a
 - 6 second number of bits that is smaller than first number of bits by
 - 7 multi-gradation processing; and
 - 8 switching the signal conversion between a first state in which the
 - 9 input first video signal requires multi-gradation processing and a second
 - 10 state in which the input first video signal does not require multi-gradation
 - 11 processing.
- 1 12. (Original) The method according to claim 11 wherein the reverse-gamma
- 2 correction is provided with first reverse-gamma correction characteristics
- 3 that allows the conversion processing, and the second reverse-gamma
- 4 correction characteristics that does not allow the conversion processing,
- 5 the switch switching the first processor between the first and the second
- 6 reverse-gamma correction characteristics.

- 1 13. (Original) The method according to claim 11 wherein the reverse-gamma
2 correction is provided with first reverse-gamma correction characteristics
3 that allows the conversion processing, and the second reverse-gamma
4 correction characteristics that does not allow the conversion processing,
5 the switch switching the reverse-gamma correction between the first and
6 the second reverse-gamma correction characteristics.
- 1 14. (Original) The method according to claim 12 wherein each of the first and
2 the second characteristics exhibits a relationship between input gradation
3 level and output gradation level, and the output gradation for the second
4 characteristics more varies than that for the first characteristics with
5 respect to the input gradation.
- 1 15. (Original) The method according to claim 13 wherein each of the first and
2 the second characteristics exhibits a relationship between input gradation
3 level and output gradation level, and the output gradation for the second
4 characteristics more varies than that for the first characteristics with
5 respect to the input gradation.
- 1 16. (Original) The method according to claim 11 wherein the signal
2 conversion step includes the step of converting lower significant bits of
3 the reverse-gamma correction-applied input first video signal into zero
4 before the signal conversion, the lower significant bits corresponding to a
5 difference between the first and the second video signals, to switch the
6 signal conversion into the second state.
- 1 17. (Original) A method of displaying an image based on an input video
2 signal, the method comprising the steps of:
 - 3 applying reverse-gamma correction to an input first video signal;
 - 4 generating error data in response at least to a data portion of lower
5 significant bits of the first number of bits of the first input video signal, the
6 lower significant bits corresponding to a difference between the first and

7 the second number of bits, the error data being obtained by multiplying
8 the data portion by predetermined error diffusion coefficients according to
9 pixel dots that surround a pixel dot composed of R(red)-, G(green)- and
10 B(blue)-signal components of the first input video signal, the generated
11 error data being added to the first input video signal, thus converting the
12 first input video signal into the second video signal; and

13 setting the generated error data at zero to halt the signal
14 conversion.

1 18. (Original) A method of displaying an image based on an input video
2 signal, the method comprising the steps of:

3 applying reverse-gamma correction to an input first video signal
4 having a first number of bits, the reverse-gamma correction being
5 provided at least with first reverse-gamma correction characteristics and
6 second reverse-gamma correction characteristics different from the first
7 characteristics;

8 converting the reverse-gamma correction-applied first input video
9 signal into a second video signal having a second number of bits smaller
10 than the first number of bits, by generating error data in response at least
11 to a data portion of lower significant bits of the first number of bits of the
12 first input video signal, the lower significant bits corresponding to a
13 difference between the first and the second number of bits, the error data
14 being obtained by multiplying the data portion by predetermined error
15 diffusion coefficients according to pixel dots that surround a pixel dot
16 composed of R(red)-, G(green)- and B(blue)-signal components of the
17 first input video signal, the generated error data being added to the first
18 input video signal;

19 turning on or off the conversion of the first input video signal to the
20 second video signal;

21 switching the reverse-gamma correction between the first and the
22 second reverse-gamma correction characteristics with respect to a first
23 state in which the input first video signal requires the input video signal

24 conversion and a second state in which the input first video signal does
25 not require the input video signal conversion; and
26 setting all the lower significant bits of the first input video signal at
27 zero to turn off the signal conversion to achieve the second state.

1 19. (Original) A method of displaying an image based on an input video
2 signal, the method comprising the steps of:

3 applying reverse-gamma correction to an input first video signal
4 having a first number of bits, the reverse-gamma correction being
5 provided at least with first reverse-gamma correction characteristics and
6 second reverse-gamma correction characteristics different from the first
7 characteristics;

8 converting the reverse-gamma correction-applied first input video
9 signal into a second video signal having a second number of bits smaller
10 than the first number of bits, by generating error data in response at least
11 to a data portion of lower significant bits of the first number of bits of the
12 first input video signal, the lower significant bits corresponding to a
13 difference between the first and the second number of bits, the error data
14 being obtained by multiplying the data portion by predetermined error
15 diffusion coefficients according to pixel dots that surround a pixel dot
16 composed of R(red)-, G(green)- and B(blue)-signal components of the
17 first input video signal, the generated error data being added to the first
18 input video signal;

19 turning on or off the conversion of the first input video signal to the
20 second video signal;

21 switching the reverse-gamma correction between the first and the
22 second reverse-gamma correction characteristics with respect to a first
23 state in which the input first video signal requires multi-gradation
24 processing and a second state in which the input first video signal does
25 not require multi-gradation processing; and

26 setting all the generated error data at zero to turn off the signal
27 conversion to achieve the second state.

1 20. (Original) An apparatus of displaying an image based on an input video
2 signal comprising a reverse-gamma corrector to apply reverse-gamma
3 correction to the input video signal, the reverse-gamma corrector being
4 provided with at least first and second reverse-gamma correction
5 characteristics each representing a relationship between an input
6 gradation level and an output gradation level, the first characteristics
7 being composed of a first straight line having a first gradient from an input
8 gradation level zero to a predetermined input gradation level, the second
9 characteristics being composed of a second straight line having a second
10 gradient from the input gradation level zero to the predetermined input
11 gradation level, the first and the second gradient being different from
12 each other, each straight line being followed by a curve at the
13 predetermined input gradation level.

1 21. (Original) An apparatus of displaying an image based on an input video
2 signal comprising:
3 a first processor to apply reverse-gamma correction to an input
4 first video signal having a first number of bits, the reverse-gamma
5 corrector being provided with at least first and second reverse-gamma
6 correction characteristics each representing a relationship between an
7 input gradation level and an output gradation level, the first characteristics
8 being composed of a first straight line having a first gradient from an input
9 gradation level zero to a predetermined input gradation level, the second
10 characteristics being composed of a second straight line having a second
11 gradient from the input gradation level zero to the predetermined input
12 gradation level, the first and the second gradient being different from
13 each other, each straight line being followed by a curve at the
14 predetermined input gradation level;
15 a second processor having at least a first and a second generator
16 to convert the first input video signal into a second video signal having a
17 second number of bits smaller than the first number of bits, each

18 generator generating error data in response at least to a data portion of
19 lower significant bits of the first number of bits of the first input video
20 signal, the lower significant bits corresponding to a difference between
21 the first and the second number of bits, the number of the lower
22 significant bits being different from each other between the first and the
23 second generators, the error data being obtained by multiplying the data
24 portion by predetermined error diffusion coefficients according to pixel
25 dots that surround a pixel dot composed of R(red)-, G(green)- and
26 B(blue)-signal components of the first input video signal, the generated
27 error data being added to the first input video signal; and
28 a switch to switch the first processor between the first and the
29 second reverse-gamma correction characteristics, thus generating a
30 switching signal, in response to the switching signal, the second
31 processor being switched between the first and the second generators
32 with respect to the different number of bits of the lower significant bits.

1 22. (Original) An apparatus of displaying an image based on an input video
2 signal comprising:
3 a first processor to apply reverse-gamma correction to an input
4 first video signal having a first number of bits, the reverse-gamma
5 corrector having reverse-gamma correction characteristics representing a
6 relationship between an input gradation level and an output gradation
7 level, the characteristics being composed of a straight line having a
8 gradient $1/t$ ($t \geq 1$) from an input gradation level zero to a predetermined
9 input gradation level, the straight line being followed by a curve at the
10 predetermined input gradation level; and
11 a second processor to convert the first input video signal into a
12 second video signal having a second number of bits smaller than the first
13 number of bits, by generating error data in response at least to a data
14 portion of lower significant bits " n " ($t = 2^n$) of the first number of bits of the
15 first input video signal, if " n " including decimal places, the decimal places
16 being rounded down, the lower significant bits corresponding to a

17 difference between the first and the second number of bits, the error data
18 being obtained by multiplying the data portion by predetermined error
19 diffusion coefficients according to pixel dots that surround a pixel dot
20 composed of R(red)-, G(green)- and B(blue)-signal components of the
21 first input video signal, the generated error data being added to the first
22 input video signal.